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Art Unit: 1731

Response to Office action mailed 01/18/2006

Amendments to the Claims

Please replace paragraph [00162] by the following amended paragraph:

[00162] Figure 18g shows that in order to achieve the required optical and mechanical properties of buffer, the first optimized thermal treatment should preferably be carried out on the above-formed structure consisting of 10.0 μ m thick buffer 12 on the front (top) face of the wafer 10, its equivalent 10.0 μ m thick buffer 14 on the back (bottom) face of the wafer, a remaining 0.4 μ m thick PECVD silicon nitride layer 16 on the back ~~face~~ side of the wafer under the thick buffer 14, and a compensating 0.3 μ m thick PECVD silicon nitride layer 18 on the front face of the wafer[[:]].

Amendments to the Claims

Please amend the claims as follows. This listing of the claims will replace all prior versions, and listings of claims, in the application:

1. (currently amended) A method of ~~reducing stress-induced mechanical problems in optical quality components having a plurality of layers with different refractive indices~~making an optical waveguide having a plurality of layers with different refractive indices, comprising carrying out the following steps in sequence:

- a) fabricating a first structure resistant to wafer warp during thermal processing by PECVD (Plasma Enhanced Chemical Vapor Deposition), said first structure comprising a silicon wafer having a first silicon nitride layer on a top front-face thereof, a first buffer layer on said first silicon nitride layer, a second buffer layer on a back-bottom face of said wafer, and a second silicon nitride layer ~~under-underneath~~ and contiguous with said second buffer layer;
- b) reducing optical absorption and compressive stress in said buffer layers by subjecting said first structure to a first thermal treatment, said first thermal treatment comprising:
 - i) stabilizing a diffusion tube at an initial stabilization temperature lying between 300°C and 700°C;
 - ii) inserting said first structure into said diffusion tube of step b(i);
 - iii) stabilizing said first structure at said initial stabilization temperature;
 - iv) decreasing compressive stress in said buffer layers from an initial compressive value by subjecting said first structure to a temperature that ramps up a rate lying in the range 1°C/min to 25°C/min from said initial stabilization temperature to a constant temperature of between 800°C and 1300°C;
 - v) further decreasing compressive stress in said buffer layers and reducing optical absorption by continuing to subject said first structure to said constant temperature in step b(iv) of at least 800°C for a period of at least 30 minutes;
 - vi) causing said first structure to undergo an elastic deformation wherein the compressive stress in said buffer layers increases linearly to a final compressive value that is less than said initial compressive value by ramping down said temperature to which said

- first structure is subjected to a final stabilization temperature a rate lying in the range 1°C/min to 25°C/min; and
- vii) extracting said first structure from said diffusion tube of step b(i) at said final stabilization temperature thereof;
- c) depositing a silica core layer on said buffer layer on said front face of the wafer by PECVD to form a second structure;
- d) reducing optical absorption and tensile stress in said core layer by subjecting said second structure to a second thermal treatment, said second thermal treatment comprising:
- i) stabilizing a diffusion tube at a temperature at an initial stabilization temperature lying between 300°C and 700°C;
 - ii) inserting the second structure into said diffusion tube of step d(i) at said initial stabilization temperature;
 - iii) relieving tensile stress in said core layer from an initial tensile value by subjecting said second structure to a temperature that ramps up a rate lying in the range 1°C/min to 25°C/min to a constant temperature of between 600°C and 1300°C;
 - iv) reducing optical absorption by continuing to subject said second structure to said constant temperature ~~between 600°C and 1300°C~~ in step d(iii) for a period of at least 30 minutes; and
 - v) causing said second structure to undergo elastic deformation and said tensile stress in said core layer to decrease linearly to a final tensile value that is less than said initial tensile value by ramping down said temperature to which said second structure is subjected to a final stabilization temperature a rate lying in the range 1°C/min to 25°C/min;
 - vi) extracting said second structure from the diffusion tube of step d(i) at said final stabilization temperature thereof; and
- e) depositing a cladding layer over said core layer.

Claims 2 to 6 are canceled

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7.(currently amended) A method as claimed in claim 1, wherein said rate in steps b(iv) and d(iii) is 5°C/min.

8.(canceled)

9.(currently amended) A method as claimed in claim 1, wherein in step b(i) said initial stabilization temperature is about 400°C.

10.(canceled)

11.(currently amended) A method as claimed in claim 1, wherein said rate in steps b(vi) and d(v) is 2.5°C/min.

12.(canceled)

13.(currently amended) A method as claimed in claim 1, wherein in step ~~b(ii)~~b(v) the constant temperature ~~of at least 800°C~~ to which said first structure is continued to be subjected is 900°C.

14.(previously presented) A method as claimed in claim 1, wherein said first and second thermal treatments are carried out in the presence of an inert gas.

15.(previously presented) A method as claimed in claim 1, wherein said first and second treatments are carried out in the presence of a gas selected from the group consisting of: nitrogen, oxygen, hydrogen, water vapour, argon, fluorine, carbon tetrafluoride, nitrogen trifluoride, and hydrogen peroxide.

16.(previously presented) A method as claimed in claim 14, wherein said inert gas has a constant flow rate.

17.(previously presented) A method as claimed in claim 16, wherein said flow rate of said inert gas lies in the range 1 liter/min. to 100 liters/min.

18.(canceled)

19.(currently amended) A method as claimed in claim ~~[[18]]~~ 1, wherein in step ~~d(ii)~~d(iv) the constant temperature ~~of at least 600°C~~ to which said second structure is continued to be subjected is 900°C.

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Claims 20 to 31 are canceled.